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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte AUDE PRIEUR-BLANC and JEAN-PAUL CANO

Appeal 2008-5800
Application 10/068232
U.S. Patent Publication 2003/0025228
Technology Center 1700

Decided: October 23, 2008

Before: FRED E. McKELVEY, *Senior Administrative Patent Judge*, and RICHARD E. SCHAFER and SALLY GARDNER LANE, *Administrative Patent Judges*.

McKELVEY, *Senior Administrative Patent Judge*.

DECISION ON APPEAL

A. Statement of the case

Essilor International Compagnie Generale d'Optique ("Essilor"), the real party in interest, seeks review under 35 U.S.C. § 134(a) of a final rejection of claims 18-34 as being unpatentable under 35 U.S.C. § 103 over the prior art.

We have jurisdiction under 35 U.S.C. § 6(b).

B. Findings of fact

The following findings of fact are believed to be supported by a preponderance of the evidence. References to the specification are to U.S. Patent Publication 2003/0025228. To the extent that a finding of fact is a conclusion of law, it may be treated as such. Additional findings as necessary may appear in the Discussion portion of the opinion.

The general field of the invention

The invention relates to a method for surface polishing an optical article made from a transparent thermoplastic material. Specification, ¶ 0001.

Background

The main surfaces of an optical article are conventionally subjected to surface polishing. Specification, ¶ 0002.

The surface polishing of an optical article involves a group of operations which lead to production of an optical article, such as a lens whose surfaces are perfectly polished and have the desired curvatures (optical powers). Specification, ¶ 0003.

Surface polishing typically comprises three successive steps: (1) grinding, (2) fine grinding, and (3) polishing. Specification, ¶ 0004.

Grinding is a mechanical processing step using a coarse-grain diamond cutter or an insert cutter, intended to create the curvature on the surface of the optical article such as a lens or contact lens. Specification, ¶ 0005.

Fine grinding is also a mechanical processing step, performed after the grinding, using a fine-grain diamond cutter or emery (or paper or

carborundum). The surface of the optical article after this fine grinding has a matt appearance. Specification, ¶ 0006.

The final operation of the surface polishing, which is said to lead to a perfectly polished and transparent surface, is called polishing and again consists of a mechanical treatment using felt discs in contact with a fine abrasive suspension. Specification, ¶ 0007.

Grinding, which as stated above has the principal object of conferring the desired curvature to at least one surface of the optical article such as a lens or a contact lens, is a step of short duration which leads to an opaque optical article whose ground surface shows waves, defects of large amplitude and low frequency, generally in the form of a spiral pattern, onto which are superimposed a roughness consisting of defects of small amplitude and high frequency. Specification, ¶ 0008.

Fine grinding further changes the geometry of the treated surface of the optical article but is essentially intended to remove the waves to the extent possible. Specification, ¶ 0009.

A fine grinding mechanical treatment step leads to a translucid (but not yet transparent) article whose polished surface still shows significant roughness. Specification, ¶ 0010.

Polishing, a relatively long mechanical processing step, which does not change the geometry of the treated surface of the article, removes the remaining roughness as far as possible to give the final transparent optical article. Specification, ¶ 0011.

Although a purely mechanical surface polishing such as that described above does enable the production of acceptable optical articles, either from

inorganic or organic glass, it is said to have several disadvantages. Specification, ¶ 0012.

According to Essilor, it is a long process, due in particular to the polishing step. Practice has also shown that it is difficult to remove the waves of large amplitude and low frequency. Finally, the mechanical fine grinding and polishing steps are steps which require a substantial range of equipment and are thus relatively costly. Specification, ¶ 0013.

The invention

According to the invention, the method of surface polishing of at least one principal surface of an optical article made from transparent thermoplastic material comprises (1) a grinding step, (2) a fine grinding step and (3) a polishing step and is characterized by the fact that the (a) fine grinding and/or (b) polishing step consists of performing what Essilor refers to as an "attack" on the surface by a solvent or a mixture of organic solvents of the transparent thermoplastic material of the optical article. Specification, ¶ 0019.

The attack step preferably occurs in the polishing step of the surface polishing method—in other words the step of removal of the roughness of the surface of the article. Specification, ¶ 0020.

After grinding, the roughness of the surface of the article is said to be generally characterized by a mean deviation of the roughness profile from the mean line, Ra, of 0.1 to 0.9 µm, typically of 0.2 to 0.5 µm. The polishing step by attack according to the invention is said to enable the Ra value to be reduced by a factor of 5 or more. Specification, ¶ 0021.

In its Reply Brief, counsel for Essilor tells us that "after the solvent treatment step of … [Essilor's] invention, the roughness profile Ra will range from 0.02 to 0.18 µm, typically 0.04 to 1 µm. Reply Brief, page 4.

According to the invention, the attack step of the surface polishing method may be implemented in several ways (¶ 0022): (1) contacting the surface to be treated with a vapor phase of the solvent (¶ 0023), (2) dipping the surface into the solvent (¶ 0028) and (3) contacting the surface with the solvent in a centrifuge (¶ 0029).

The method of surface polishing of the invention may be applied to any ophthalmic article in transparent thermoplastic material conventionally used in the field concerned. Specification, ¶ 0034.

Suitable thermoplastic materials include polycarbonates, poly(meth)acrylates, polythio(meth)acrylates and their mixtures. The preferred thermoplastic materials are the polycarbonates, for example bisphenol A polycarbonate. Specification, ¶ 0035.

The solvent or mixture of solvents suitable for the method of the invention may be any solvent or mixture of solvents of the thermoplastic material to be treated. Specification, ¶ 0036.

The preferred solvents, in particular for the polycarbonate optical articles, include (1) dichloromethane (CH_2Cl_2), (2) trichloromethane ($CHCl_3$), (3) the dichloroethanes such as 1,2-dichloroethane, (4) acetone, (5) methyl ethyl ketone, (6) tetrahydrofuran (THF), (7) dioxane and (8) their mixtures. Specification, ¶ 0037.

The solvent or mixture of solvents of the thermoplastic material to be treated may contain, in limited proportion, up to 20% by weight, preferably up to 15% by weight of an organic diluent which is not a solvent of the thermoplastic material to be treated. An example of such an organic diluent is ethylene glycol diacetate. Specification, ¶ 0038.

The solvent or mixture of solvents is preferably *pure*, in other words it contains only the solvent or mixture of solvents and during the attack on the surface of the article, in particular a polycarbonate article, only the thermoplastic material of the article is dissolved in this solvent or these solvents. Specification, ¶ 0039.

As will become apparent, the claims on appeal cover the use of Essilor's preferred embodiment, i.e., use of a "pure" solvent or mixture of "pure" solvents.

Claims on appeal

Claims 18-34 are on appeal.

Independent claim 18, which we reproduce from the claim appendix of the Appeal Brief, reads [some indentation, italics, and bracketed material added]:

> A method of surface polishing of at least one principal surface of an optical article made from a transparent thermoplastic material comprising the successive steps of:
>
> [1] grinding;
>
> [2] fine grinding; and
>
> [3] polishing

wherein the fine grinding and/or the polishing comprises attacking the principal surface of the [optical] article with a solvent or a mixture of organic solvents [of the transparent thermoplastic material] and *not with a non-solvent of the transparent thermoplastic material.*

Dependent claims are addressed as needed later in this opinion.

Examiner's rejection

The examiner has rejected all the claims as being unpatentable under 35 U.S.C. § 103 over (1) the prior art admitted in the specification [Specification, ¶¶ 0002-0013, reproduced above] and (2) Duchane, U.S. Patent 4,376,751 issued 15 March 1982.

Duchane is prior art under 35 U.S.C. § 102(b).

Prior art

Duchane relates generally to a method of producing super-smooth articles made of thermoplastic materials and to the articles thus produced and relates more particularly to a method of producing super-smooth articles made of acrylic polymers or acrylonitrile-butadiene-styrene polymers. Col. 1:5-10.

According to Duchane, despite what has been known in the prior art, a need has existed until now (*i.e.*, 1981—Duchane's filing date) for a method of producing super-smooth rounded or formed surfaces made of thermoplastic material which are smoother than those obtained by diamond knife machining. By the term "super-smooth" is meant surface quality wherein all defects are smaller than about 4 $(\mu m)^2$ in area. Col. 2:48-54.

Duchane is said to achieve its objectives of producing at least one super-smooth surface on an article made of thermoplastic material with a process which includes the step of immersing at least a portion of the article into a bath consisting essentially of (1) at least one solvent for the thermoplastic material and (2) at least one non-solvent for the thermoplastic material. The thermoplastic material may be a poly(methyl methacrylate) or an acrylonitrile-butadiene-styrene polymer. Col. 3:17-27.

In the practice of the method of the Duchane invention, the uniformity of the surface of a thermoplastic material is said to be greatly improved by placing the material into a bath, through which a mixture (which varies with time) of materials is circulated over an extended period of time. The thermoplastic material should be a material which is capable of being softened and being penetrated by components of the bath without being dissolved in the bath. Col. 5:26-35.

The bath consists essentially of at least one solvent and at least one non-solvent for the thermoplastic material, together with optional accessory material which is soluble in the bath and which one may wish to deposit into the amorphous material. Duchane says that the result of the use of the non-solvent is critical to achieving the super-smooth surfaces; and the result is said to be demonstrated in Examples 1 and 3. Col. 5:36-43.

A suitable solvent is acetone. Col. 5:47.

Since the examiner relies on Duchane Examples 1 and 3, we reproduce those examples below.

Example 1
(identified by Duchane as a "control")
An acrylic rod was immersed in pure acetone for 5 minutes, then removed, and allowed to dry. Immediately after removel [sic-removal] from the acetone, the surface of the rod appeared to be smooth. However, the surface became microscopically undulating as the acetone evaporated. Microscopic examination at about 20-40 X showed that surface scratches had been eliminated but that transverse ripples, rounded pits, and lumps were now present.

From the results in Example 1 and Example 3 (below), it appears that a non-solvent is necessary to achieve a super-smooth surface. The non-solvent allows the controlled extraction of the solvent from the substrate.

Duchane Example 3
(identified by Duchane as a "control")
An acrylic rod was exposed to vapor from boiling acetone for about 5 minutes. The vapor temperature was approximately 57 °C. Upon removal from the treatment chamber, the surface was clear and superficially smooth at first, but the surface gradually took on a blistered appearance as white, circular imperfections began to form on it.

What Duchane attempts to do is to make a product which is better than the products made in Examples 1 and 3. Duchane accomplishes better products through the use of a combination of a solvent and a non-solvent. Duchane does not say that the products made with only a solvent are

"inoperable" or "totally undesirable." All Duchane says is that "I can do better."

Differences between claim 18 and the prior art

The "admitted prior art" (Specification, ¶¶ 0002-0013) differs from the subject matter of claim 18 in that the admitted prior art does not describe a fine grinding or polishing step comprising "attacking" the principal surface with a solvent for the thermoplastic material.

Examiner's position on obviousness

The examiner found that while Duchane believes it is necessary to use a mixture of a solvent and a non-solvent, in Examples 1 and 3 Duchane nevertheless describes the use of a solvent without a non-solvent.

The examiner recognizes that the ultimate products described in Examples 1 and 3 have "transverse ripples, rounded pits, and lumps" (Example 1) or a blistered appearance as white, circular imperfections" (Example 3).

However, the examiner could not find in claim 18 any limitation which would distinguish the claimed materials from those having the properties described in Examples 1 and 3 of Duchane.

While the process of Examples 1 and 3 of Duchane are not preferred, and indeed are sought to be avoided by Duchane for its purpose, the examiner notes that Examples 1 and 3 are nevertheless part of the relevant prior art.

To the extent that a person skilled in the art can live with the properties described in Examples 1 and 3 of Duchane, it was the examiner's view that use of the process of Examples 1 and 3 in combination with the

admitted prior art renders the subject matter of claim 18 unpatentable under § 103.

C. Discussion

According to Essilor, the examiner erred in entering the § 103 rejection. We disagree.

Claim 18

In making a rejection, an examiner can rely on non-preferred embodiments described in a prior art patent. *In re Mills*, 470 F.2d 649,651 (CCPA 1972); *In re Chapman*, 53 CCPA 978, 985, 357 F.2d 418, 424 (CCPA 1966). That is what the examiner did in this case.

While conceding, as it must, that Duchane seeks super-smooth surfaces on thermoplastic materials, Essilor says Duchane "teaches away" from the invention of claim 18. Why? Because, Duchane discourages use of a solvent alone. However, what Duchane discourages is use of a solvent alone provided one cannot "live with" the properties obtained in Examples 1 and 3. The examiner correctly points out that nothing in claim 18 would indicate that use of the claim 18 process would not avoid the very properties obtained in Duchane Examples 1 and 3.

Responding to the examiner in its Reply Brief, Essilor argues (1) that according to the MPEP one can look to an applicant's specification for properties and (2) when does so in this case one learns that the Essilor products roughness profile Ra will range from 0.02 to 0.18 µm, typically 0.04 to 0.1 µm. Reply Brief, page 4. According to argument of counsel for Essilor, the products of Duchane Examples 1 and 3 do not fall within the scope of Essilor's described Ra ranges. This is not a case where a word in a

claim is being interpreted in light of the specification. This is a case where Essilor improperly attempts to incorporate into claim 18 an Ra "limitation" found only in the Essilor specification. Essilor's "remedy" was to amend the claim by inserting the Ra profile "limitation" described in its specification. The examiner did not err in rejecting Essilor's attempt.

Essilor next argues that a polished surface is not obtained in Duchane when a non-solvent is not used. Appeal Brief, page 17. As noted earlier, Duchane's Example 1 and 3 and Essilor seemingly use the same process—only a solvent. Nowhere does this record convincingly establish that Essilor's process necessarily results in properties which differ from those described in Examples 1 and 3 of Essilor—particularly the process as broadly recited in claim 18. It may be possible that some embodiments made by using the process of claim 18 might not have the Example 1 and 3 properties (a fact not convincingly established on the record). However, unless Essilor can establish that the process of claim 18, as broadly presented to the PTO, does not result in those properties, we think the examiner has a point concerning the use of the Examples 1 and 3 process to treat the products of the "admitted prior art."

Duchane is said to "disparage" the use of a solvent without a non-solvent. Appeal Brief, page 18. While true, the disparagement is vis-à-vis Duchane's use of a solvent in combination with a non-solvent, where products are sought which do not have the properties of those described in Examples 1 and 3. Although it had an opportunity to do so (37 C.F.R. § 1.132), Essilor has not presented any cogent evidence to suggest that the products of Examples 1 and 3 are not useful. In other words, what is the

significance of "ripples, "rounded pits," and "lumps"? On this record, we have not been told. Nor are we told that Essilor's products do not likewise have "ripples, "rounded pits," and "lumps."

Essilor maintains that there is no "motivation" to use the Duchane Example 1 process in combination with the admitted prior art. Apparently, Essilor is looking for an "express" teaching in the prior art—"use the Duchane Example 1 treatment to replace the polishing step of the admitted prior art." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007), forecloses that narrow approach. The admitted prior art concedes that it is difficult to remove the waves of *large* amplitude using a pure mechanical process. Specification, ¶ 0013. Likewise, the admitted prior art reveals that use of mechanical equipment is relatively *expensive*. A person skilled in the art, aware of the Duchane Example 1 process, would appreciate the fact that some improvement could be achieved using the Example 1 process, albeit a perfect article might not be obtained. Since there is no comparison between the "waves of large amplitude" mentioned in the admitted prior art vis-à-vis the "ripples, rounded pits, and lumps" recited in Example 1, it does not necessarily follow that the Example 1 process is "worse" than the admitted prior art process. There is a reason one skilled in the art would have used the Example 1 process—to save money making products which do not have to be perfect.

According to Essilor there is no expectation of success—according to Essilor "that combination would not work." Why not? The difficulty with Essilor's argument is that its claim 18 is too broad. How do the products made with the method of claim 18 differ from those made in Example 1?

Essilor has failed to show that the examiner erred in rejecting claim 18. Essilor does not content that dependent claims 19 and 32-24 are separately patentable apart from claim 18. Accordingly, claims 19 and 32-34 fall with claim 18.

Dependent claims

1. Claim 20

Dependent claim 20 reads:

> The method of claim 18, wherein the attacking comprises centrifugation of the solvent or a mixture of solvents on the principal surface of the article.

In the Appeal Brief, Essilor states that "Duchane and the 'admitted prior art' do not appear to mention centrifugation of the solvent." Appeal Brief, page 25.

A statement by an applicant that the prior art relied upon by an examiner does not mention "something" is not the same as an applicant stating that it is not aware of any disclosure in the prior art that the "something" is known.

In response, the examiner found that "it is generally well known to spread fluids across a surface by centrifugation." Examiner's Answer, page 5.

While the examiner cited no art in support of the finding, Essilor did not challenge the examiner's finding in the Reply Brief.

Accordingly, we have no basis upon which to disagree with the examiner's finding. *In re Eskild*, 55 CCPA 808, 810, 387 F.2d 987, 988 (CCPA 1968).

The examiner also found that Duchane describes a process wherein the solvent is "continuously circulating" while a thermoplastic material is immersed therein. Duchane, Example 4, col. 8:50.

Because centrifugation is well known and Duchane describes use of a continuous circulation, we cannot say that the examiner erred in holding one skilled in the art would have found the subject matter of claim 20 unobvious. It appears that Essilor has used known techniques for their known purpose.

Essilor's response to the examiner is that centrifugation at a speed of 4000 r.p.m. for about 9 second ejects excess solvent while continuous circulation would not eject excess solvent. The r.p.m. of the centrifugation is not mentioned in claim 21.

2. Claims 21-22

Dependent claim 21 reads:

> The method of claim 20, wherein the attacking is further defined as comprising a radial disposition [sic—deposition (¶ 0099)] of the solvent or mixture of the solvents on the principal surface.

Dependent claim 22 reads:

> The method of claim 21, wherein the radial deposition takes place from the center to the edge of the article.

In connection with claims 21 and 22, the examiner did not make a finding that radial disposition is a feature known in the art. Compare the examiner's finding with respect to claim 20 that "it is generally well known to spread fluids across a surface by centrifugation."

Essilor asserts that "Duchane and the 'admitted prior art' do not appear to mention radial disposition." Appeal Brief, page 26. Essilor further asserts that "Duchane and the 'admitted prior art' do not appear to mention radial deposition or deposition taking place from the center to the edge of the article." Appeal Brief, page 27. We note that Essilor's assertions are narrowly limited to just Duchane and the admitted prior art. Nevertheless, we view the assertions as also being a positive representation that, as far as Essilor is concerned, it is unaware of any prior art which describes radial deposition or deposition taking place from the center to the edge of an article. 37 C.F.R. § 1.56. It is on that narrow basis that we decide the appeal with respect to claims 21-22.

The relevant portion of the specification reveals the following (¶¶ 0098 through 0102) (bold added):

> [0098] The article was then placed on the axis of the centrifugation device where it was maintained by suction.
>
> [0099] Once the article had reached a rotation speed of 4000 r.p.m., the solvent was dynamically deposited on the surface of the article in a rapid movement from the centre towards the edge (C to E), so as to cover the whole of the surface. This deposition of solvent took about 1 second. This dynamic deposition (radial deposition) gave a homogeneous distribution of the solvent over the surface of the article.
>
> [0100] After the solvent had been deposited, the article was rotated at a speed of 4000 r.p.m. for about 9 seconds, i.e. a total attack time of about 10 seconds. During the final 9

> seconds, the excess solvent on the surface was ejected. The solvent which had penetrated into the polycarbonate network evaporated.
>
> [0101] The rotation was then stopped (about 3 seconds required to bring to a complete halt) and the article was recovered.
>
> [0102] At this stage, the treated surface of the article was dry and the article could be handled.

Since no prior art has been called to our attention which would reveal that "radial deposition" is known in the art, the examiner has not established that a step in the process of claims 21-22 is known. On that basis alone, we will reverse the § 103 prior art rejection of claims 21-22. Had prior art been called to our attention, our disposition of claims 21-22 would have been different.

3. Claims 23-26

Claim 23 reads:

> The method of claim 18, wherein the attacking is performed by contacting the principal surface with a vapor of the solvent or mixture of solvents.

Example 3 of Duchane describes attacking a rod (thermoplastic article) with vapor from boiling acetone. Col. 8:37-38. Based on Duchane's disclosure, the examiner found that it would have been obvious to polish an article by exposing the article to solvent vapor.

Essilor attacks the examiner's position by noting that the "results" of the Duchane Example 3 attack include "a blistered appearance …." The

difficulty with Essilor's attack is that it has not shown that it gets any result which differs from that of Duchane Example 3.

Claims 24-26 are not argued separately apart from claim 23 and therefore fall with claim 23.

4. Claims 27-28

Claim 27 reads:

> The method of claim 23, wherein the contacting of the principal surface with the vapor of the solvent or mixture of solvents comprising saturation with the vapor of the solvent or mixture of solvents.

Essilor has not established that the principal surface of the article treated in Duchane Example 3 is not saturated with acetone vapor. Since both the claimed and the Duchane Example 3 methods appear to be similar, there is no basis upon which to find that any different result is achieved with one method vis-à-vis the other method.

5. Claims 29-31

Claim 29 reads [matter in brackets added]:

> The method of claim 18, wherein attacking comprises both [1] an attacking by centrifugation of the solvent or the mixture of organic solvents and [2] an attacking with a vapor phase of the solvent and organic solvent.

Claim 30 reads [bold added]:

> The method of claim 29, wherein the attacking by centrifugation of the solvent or mixture of organic solvents

occurs before the attacking with a vapor phase of the solvent or mixture of organic solvents.

Claim 31 reads [bold added]:

> The method of claim 29, wherein the attacking by centrifugation of the solvent or mixture of organic solvents follows the attacking with a vapor phase of the solvent or mixture of organic solvents.

The method of claim 29 amounts to use of two obvious methods: centrifugation (see claim 20) and attack with a vapor of the solvent (see claim 24). The arguments with respect to claim 29 are similar to those for claim 20. Because we find the claim 20 arguments not convincing, we likewise find the claim 29 arguments not convincing.

While it may be true that the prior art does not describe the use of a combination of processes, each process is within the skill of the art and therefore within the public domain. *In re Translogic Technology, Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). That being the case, use of a combination of obvious public domain processes, one after the other to achieve the objectives of the known processes, generally would be considered obvious since both would expected to result in polishing of an optical material. *Cf. In re Kerkhoven*, 626 F.2d 846 (CCPA 1980).

Other arguments

We have considered Essilor's remaining arguments and find none that warrant reversal of the Examiner's rejection, apart from claims 21-22. *Cf. Hartman v. Nicholson*, 483 F.3d 1311, 1315 (Fed. Cir. 2007).

D. Decision

The decision of the examiner rejecting claims 21-22 is *reversed*.

The decision of the examiner rejecting the other claims on appeal is *affirmed*.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2008).

AFFIRMED-IN-PART and REVERSED-IN-PART

ack

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